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garian treatises? Are they to be ignored? or must we all become polyglots? The writer recently asked an eminent German professor if he read Russian. His answer states the whole question. "No. If some stupid writes his descriptions in Japanese, must I thereupon study Japanese?" It is time to cry a halt in this direction. The possibility of a literature of science in Japanese is not so remote, unless there be some universal agreement in regard to the language in which scientific discoveries must be clothed in order to claim early recognition.

We do not know the merits of "Volapük" as a medium of scientific publication, but we suggest that the time is at hand when that or some other common language will have to be formally adopted by scientific authors.

DR. T. N. GILL writes an article for the *Forum* (of New York) on the possible existence of a sea-serpent. He regards as unreliable most of the stories of its alleged appearance, but says that if existing, it is more likely to be a snake-like Cetacean or shark than anything else. In the succeeding number, Professor R. A. Proctor, the astronomer, asserts the strong probability that the sea-serpent exists, and that, if so, it is likely to prove to be a remaining species of the Mesozoic saurians. If Professor Proctor were as good a zoologist as he is an astronomer, he would perceive that this supposition is quite outside the range of scientific probability, and that those of Professor Gill are much more likely to prove true.

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## RECENT LITERATURE.

**Wortman on the Teeth of the Vertebrata.**<sup>1</sup>—We have in this monograph a work which students of odontography will find it to their advantage to consult. Dr. Wortman's excellent opportunities in the museums of the country have been improved so as to enable him to present the latest results of research among the extinct as well as the recent Vertebrata. The subject is approached by analytic tables of the systematic arrangement of the various divisions of this branch of the animal kingdom. In the history of the origin of teeth he has sought the latest embryological works, and gives us a well-digested account of the results. He

<sup>1</sup> Comparative Anatomy of the Teeth of the Vertebrata. By J. L. Wortman, M.D. Reprinted from The American System of Dentistry. Pp. 153. 1886.

advances a theory of dental succession which is opposed to the prevalent one, and which, as it appears to us, accounts better for the facts. It is thus stated (p. 500): "In the Batrachia and Reptilia there are many sets of teeth developed during the life of the individual, of which the first arises *de novo*, and all the succeeding ones are derived from that which precedes it. Altogether, I am disposed to regard the diphyodont mammalian dentition in the same light: those teeth which take their origin primarily from the epithelial lining of the mouth are strictly homologous with the first set of the lower vertebrates. This would include in the first set the deciduous incisors, canines, molars, and the first true or permanent molars. The second set of the batrachian and reptile would be represented by the permanent incisors, canines, premolars, and second true molar. The third succession would be represented by the last molar of the diphyodont dentition."

The monograph is well illustrated by wood engravings.

**Kedzie's Gravitation, Solar Heat, and Sun-Spots.**<sup>1</sup>—Professor Kedzie's interesting book makes a sensible addition to the light necessary to the understanding of that form of energy known as gravitation. He starts with the kinematists in refusing to credit the existence of attraction, or the action of matter where it is not, and uses the Le Sagian idea of external pressure as the principle of gravitation. But he differs from Le Sage in not admitting this force to be derived from hypothetical molecules, and in asserting that it is the mechanical energy due to vibrations of the ether moving towards the sun. He goes further and attempts to account for the source of this energy. He regards it as the equivalent of the heat which is radiated from the suns of the universe into space in such prodigious quantities, which is metamorphosed into mechanical energy and returns to its source in this form. The reasons for believing in the return are thus stated. Assuming space to be infinite, and to be full of the ether, he conceives the latter to be full of energy. Any addition to this energy from any source will cause an overflow, which will naturally be in the direction of the region from which the emission took place. Hence between the sun and the surrounding space there is an endless cycle of outgoing and incoming energy. The reason why this returns as mechanical and not as thermal vibrations he supposes to be as follows. The conversion of mechanical motion into heat being caused by resistance or contraction of space, the reverse process of converting heat into mechanical movement will result from the opposite physical condition; *i.e.*, the reduction of pressure and expansion of space.

<sup>1</sup> Solar Heat, Gravitation, and Sun-Spots. By Professor J. H. Kedzie. 8vo, 1886. S. C. Griggs & Co., Chicago.